URBAN LOOP PRIORITIZATION PROCESS

March 30, 2010

A third round to receive comments from MPO partners was completed on March 19, 2010. All comments have been compiled, reviewed and considered. While no changes were made to the criteria, the point calculations for Forecasted 2035 Total Volume and Freight Mobility criteria have been modified. The ten criteria and weights are shown in the table below and each criterion is described on the following pages. These descriptions, which were previously provided in David Wasserman's March 12, 2010 email, have been expanded to include additional information on the scoring methodology and data sources. New information is highlighted in yellow.

Summary Table of Criteria and Weights

Criteria	Weight
Needs	
Safety	5%
Congestion	10%
Benefits	
Travel Time Savings (Individual Project)	10%
Travel Time Savings (All Loop Projects w/in Area)	15%
Economic Development	15%
Forecasted 2035 Total Volume	10%
Freight Mobility (Forecasted 2035 Truck Volume)	10%
Multimodal Options	5%
Protected Corridor/Partial Right-of-Way	10%
Connectivity	10%
Total	**100%**

Needs Factors

The data for the "needs" factor will be taken from routes which run parallel to the proposed urban loop project. Parallel routes are defined as those routes currently carrying the traffic that is expected to use the new urban loop. The Department has worked with MPO staff to ensure consensus on which routes are considered "parallel routes". The data will be the most current data available in the Department's databases and the Department will ensure the same year's data be used for all 10 urban areas. The same parallel routes are used for both the Safety and Congestion Scores.

Safety Score – 5%

This criterion is a measure of the highway safety performance of the parallel routes. Higher scores are considered to have poorer highway safety performance. Points are given based on three criteria:

- Class Density Ratio – The crash density of the study area versus the average crash density of similar facilities;
- Severity Index – The measure of the severity of crashes
- Critical Crash Rate Ratio – The actual crash rate versus the critical crash rate for the study area.

The scoring range is 0 to 100, based on a combined score of the three factors (see table below as an example).

	Class Density Ratio		Severity Index		Critical Crash Rate Ratio	
Points	range		range		range	
33.3	---	1.40	76.80	6.00	---	0.90
22.2	1.40	0.80	6.00	4.50	0.90	0.65
11.1	0.80	0.40	4.50	3.75	0.65	0.45
0	0.40	0.00	3.75	1.00	0.45	0.00

Scores are provided by the Department's Mobility and Safety Division and are included in the attached excel file. All Safety data is based on a 3 year average from 2006 to 2008.

Congestion Score – 10%

This criterion is a measure of recurring congestion on the parallel routes. Higher scores are considered to have worse congestion, based on the volume-to-capacity (v/c) ratio along the parallel roadway. Volume and capacity data is based on parallel statewide and/or regional tier parallel routes only, due to the availability and reliability of the data. Where there is more than one parallel route, a final v/c ratio for the project will be calculated using the volume as the weighting factor for all parallel routes. For example:

Loop Project A

- Parallel Route #1 v/c ratio=0.85, volume=90,000
- Parallel Route #2 v/c ratio=1.2, volume=40,000

- Therefore, Weighted Congestion Score = (0.85 x (90,000/130,000) + 1.2 x (40,000/130,000)) x 100 = 0.59 + 0.37 = 0.96 x 100 = **96 points**

Segments shown in Parallel Route Spreadsheet are based on segments with the same capacity (i.e., segments of roadways with different capacities are listed separately). The traffic volumes are an average of the all the traffic count locations for each individual

segment. Only 2006 or later count data is used, using the latest available. If 2008, 2007, or 2006 data are not available for a particular traffic count location, data from the location is not used. The Department's traffic count data is contained in a GIS shapefile, and is available upon request.

Roadway capacities (for statewide and regional tier facilities only) were developed using the NC Level of Service (LOS) program. This program, developed by ITRE in coordination with NCDOT, is based on the Highway Capacity Manual. Capacities are calculated based on roadway characteristics (such as number of lanes, speed, and facility type) and the area in which the roadway is located.

Data inputs are included for each loop project in the attached excel file.

Benefits Factors:

Travel Time Savings (individual project) – 10%

This is a key measure of whether the individual urban loop project will reduce congestion and provide greater mobility. The benefits are based on travel time savings the loop project would provide to the region. The travel time savings will be calculated using the travel demand model for the area. The measure will be the reduction in vehicle hours traveled for the network. This will be determined by running the travel demand models with and without the loop projects and calculating the difference of network vehicle hours of travel (VHT). The greater the difference in vehicle hours of travel (i.e., travel time savings), the more points the project will receive.

The Existing plus Committed (E plus C) network of projects is used as the baseline network for each model. In other words, the number of hours traveled on this E plus C network is the baseline to compare whether each loop project will increase or decrease travel times in the network. The measure will be time saved in hours. Each TIP loop project will be considered separately under this criterion. Points for Travel Time Savings are calculated by dividing the Travel Time Savings (in VHT) by 1,000 for ease of scoring. The range of points is 0 to a maximum of 100.

Data inputs are included for each loop project in the attached excel file. Please be aware of the data for the Durham loop projects as outlined in the note below.

NOTE: As of March 30, 2010, the Department is continuing to analyze the travel demand model results for Durham-Chapel Hill-Carrboro MPO and does not yet have the data available for review. These results are expected by early April and will be shared with each urban area for their information when ready.

Travel Time Savings (all loop projects within area) – 15%

Similar to the previous criteria, except that this criteria measures the expected travel time savings with all the urban loop projects in one urban area completed vs. without the same urban loop projects completed. Similarly to the previous criteria, the Existing plus Committed (E plus C) network of projects is used as the baseline network. In other words, the number of hours traveled on this E plus C network is the baseline to compare whether the completed loop will increase or decrease travel times in the network. The measure will be time saved in hours. The completed loop will be compared against the existing condition. Points for Travel Time Savings are calculated by dividing the Travel Time Savings (in VHT) by 1,000 for ease of scoring. The range of points is 0 to a maximum of 100.

Data inputs are included for each loop project in the attached excel file and the same Durham note applies as was shown in the previous criteria. The Durham results will be shared for your information as soon as the data is ready.

Data inputs are included for each loop project in the attached excel file.

Economic Development – 15%

This criterion, developed in conjunction with the North Carolina Department of Commerce (DOC), is a measure of the economic impact the project brings to the region. Seven variables are used to get an indication of short-term impacts (construction impacts from the proposed road project) and current/future economic development (ED) conditions relevant to each of the proposed projects. These factors are listed below along with the weights assigned to each. Construction impacts account for 40% of the score, while ED Conditions account for 60%. Construction impacts are weighted less because these impacts are one-time only and end once the project is finished. ED Conditions are made up of economic variables. It is assumed road improvements will both benefit from, and be impacted by, each of the ED Condition variables.

Impacts	Variable	Weight
Construction	Total Project Employment	30%
	IMPLAN Employment Multiplier for Construction Activities	10%
Current/Future Conditions	Employment in Region	10%
	Employment in Distribution + Logistics + Manufacturing	10%
	Establishments in 1 Mile Buffer of Road	20%
	Projected 10 Year Population Growth in Region	10%
	State and Local Tourism Tax Receipts in Region	10%

The projects were analyzed at two geographic levels. Establishments were measured within the immediate vicinity of the proposed projects – the immediate vicinity was determined to be within 1 mile of the projects. The remaining six variables were measured at the Labor Market Area (LMA). LMA's are geographies with self-contained economies were derived by Dr. Charles Tolbert at Baylor University and are based on journey-to-work data provided in the latest decennial census (2000). Counties that are linked through cross-commuting are combined to form a region, or zone. Clusters of counties are formed into commuting zones based on maintaining an average rate of cross-commuting between zones of only 2 percent. Commuting zones are formed into labor market areas by combining commuting zones with less than 100,000 in population.

Each of the seven variables is described below:

- **Total Employment Resulting from Project Construction/Investment:** IMPLAN software is used for economic modeling. This software provides an estimate of the total jobs (direct + indirect + induced) created from project investment. Direct jobs are employment associated with the project (i.e. construction workers hired to build a road). Indirect jobs are the direct impacts result in purchases of goods and services from other industries. Employment within the supply chain is created as a result of the direct spending associated with the project (i.e. contract labor, or additional employment needed at a rock quarry). Induced jobs are employment supporting the project, resulting from household spending from those employed directly or indirectly by the project (i.e. restaurants, retail and service industry employment).

  The two main inputs for the model are the region of analysis (LMA) and the estimated construction costs of each project. IMPLAN allows researchers to develop local level input-output models to estimate the economic impact of projects. This model is widely used by local, state and federal governments, as well as universities and private industry nationwide. While economic modeling can provide general economic impact estimates, future results will be affected by political, social, and economic conditions. Since no distinction exists between the timing of any project, all construction costs were rolled into one year. This provides an estimate for the number of jobs created (each job equals one job year).

- **IMPLAN Employment Multiplier for Construction Activities:** This variable measures the number of additional or "spin-off" jobs created per direct construction job created. This is based on IMPLAN data and measured at the regional level (LMA).

- **Regional Employment:** This data is from the Employment Security Commission of North Carolina and is the average monthly total for the 2009 calendar year. Regional employment is an indicator of economic activity and employees are heavily reliant on the transportation network to commute to and from work.

- **Regional Manufacturing, Distribution and Logistics Employment:** This data comes from Economic Modeling Specialists (EMSI), which is a leading provider of economic data and analysis at various geographic areas. This variable is included for the same reasons as regional employment. In addition, it is measuring industry sectors heavily reliant on the regional transportation network.

- **Projected 10-Year Population Growth in the Region:** The state demographer (within the NC Office of State Budget and Management) provides this data. It is the population estimate for 2018 (the most recent data certified by the demographer is 2008 population figures). Regions with higher population growth will see a greater economic need for transportation infrastructure to facilitate employment and other economic activities. Population projections are generally considered more reliable than employment projections. Additionally, population data provides a more complete look on the future economies of regions. Finally, population and employment are highly correlated to each other. Thus, population projections were used as the variable of choice.

- **State and Local Tourism Tax Receipts in the Region:** This data comes from the Department of Commerce's Tourism Division and can be found at http://www.nccommerce.com/NR/rdonlyres/5E550D4A-B4DF-44EF-BE91-17629E1E15BD/0/2008NCCountyPreliminaryEstimatesEXPENDITURES.pdf. Tourism is highly dependent on the transportation network. In addition, tax receipts to state and local governments show fiscal benefits to those government entities.

- **Establishments in 1-Mile Buffer:** GIS resources are used to create a one-mile buffer around each proposed project. A road layer is overlaid with Dun & Bradstreet (D&B) data to determine the number of establishments within the buffer. D&B's dataset is used to create a count of existing businesses within the immediate vicinity of each proposed project. D&B creates and manages a location-specific dataset of over 140 business records worldwide, and updates records more than 1.5 million times daily (www.dnb.com).

The scoring for the economic development criterion is based on a project's score for the given metric, in proportion to the highest score, multiplied by the weight of the metric. For instance, if the weight of the metric is 30 and the highest score in the metric is 10, the project with the highest score would receive 30 points. If the project with the second highest score was 5, it would receive a score of 15 because (5/10*30).

Data inputs are included for each loop project in a separate attached excel file.

Forecasted 2035 Total Volume – 10%

This criterion is a measure of the expected 2035 traffic volumes to be carried by the individual loop project. One of the purposes of the Urban Loop Program is to reduce congestion and this factor simply measures the amount of traffic that is anticipated to

use the loop roadway. These 2035 volumes will also be weighted by the network link(s) and volume that makes up an individual loop project. Points are calculated by dividing the Forecasted 2035 Total Volume by 1,000 for ease of scoring. The range of points is 0 to a maximum of 100. For example:

Loop Project A

- Length of proposed loop project = 10 miles
- Start and end limits of the entire proposed loop project are coded as 3 separate network links in the travel demand model
    - Link 1 = 3 miles (showing 50,000 ADT in 2035)
    - Link 2 = 4 miles (showing 40,000 ADT in 2035)
    - Link 3 = 3 miles (showing 60,000 ADT in 2035)

- Therefore Weighted calculation = (50,000 x (3/10) + (40,000 x (4/10) + (60,000 x (3/10) = **49,000 ADT**
- Forecasted 2035 Total Volume Points = 49,000/1,000 = **49 Points**

Data inputs are included for each loop project in the attached excel file.

Freight Mobility (Forecasted 2035 Truck Volume) – 10%

Domestic movement of freight will increase dramatically and the urban loops can assist in diverting truck traffic from the central business districts (CBD), thus reducing congestion, improving safety, and reducing pavement deterioration in the CBD and on other parallel routes. The greater the expected truck volumes in 2035, the more points the project will receive. Data is derived from the travel demand models and inputs are included in the attached excel file. Points are calculated by dividing the Forecasted 2035 Truck Volume by 100 for ease of scoring. The range of points is 0 to a maximum of 100. Data inputs are included in the attached excel file.

Multi-Modal Options – 5%

This criterion is a measure of the Department's commitment to promoting multi-modal options which boosts the ability to move people and goods more efficiently on the transportation network. This criteria will focus solely on whether the loop project will include dedicated managed lanes (HOV/HOT) and/or rapid transit (light rail, bus rapid transit, etc) within the highway right-of-way in the initial construction. If a project provides any of these, it will receive 100 points. Data inputs are included in the attached excel file.

Protected Corridor/Partial Right-of-Way – 10%

This criterion measures the degree to which right-of-way has been protected or purchased for the loop project. Since right-of-way is a major cost of the loop project, points are awarded to communities which protect a potential corridor for the roadway (subject to the NEPA process), or where right-of-way has already been purchased. Data inputs are included in the attached excel file. Points will be assigned using the table below.

Protected Corridor or Partial Right-of-Way	Points
None	0
Right-of-Way Partially Purchased	50
In Protected Corridor	50
In Protected Corridor and Right-of-Way Partially Purchased	75
Right-of-Way Fully Purchased	100

The Department recognizes the Transportation Corridor Official Map Act as the primary method for protecting a corridor. Other methods will be considered provided they are legally binding and protect the corridor from development in order to serve a future transportation facility. However, Comprehensive Transportation Plans (CTPs) and Thoroughfare Plans are not legally binding and will not be considered as an official method for protecting a corridor. Additional information on the Transportation Corridor Official Map Act is found at http://www.ncleg.net/enactedlegislation/statutes/html/byarticle/chapter_136/article_2e.html .

Corridors protected by the Transportation Corridor Official Map Act by the Department can be found at http://www.ncdot.org/planning/development/TIP/corridor/corridorsummary.html
The amount of right-of-way purchased (# of parcels and amount spent) is based on the Department's latest available data.

Due to the varying project development stage each loop project is in, a point system based on the amount of right-of-way purchased, such as percentage of total right-of-way purchased, cannot be fairly used for this criterion. Several projects have multiple alternatives and therefore the number of parcels needed is not known, while other projects have right-of-way purchased (due to the corridor protection map act), but the project development process is just beginning. Data inputs are included in the attached excel file.

Connectivity – 10%

This criterion measures the improved connectivity the loop project will provide between the beginning and end points of the project. Scoring is based on the distance saved by traveling the loop roadway vs. the distance that would have been traveled using existing routes. Points are assigned on the percent decrease in length of traveling between the beginning and end points of the loop project. The existing routes and distance between

the beginning and end points of the loop project have been mapped using Google maps. Data inputs (including the Google map links) are included in the attached excel file. For example:

Loop Project A

- Length of proposed loop project = 10.2 miles
- Length of existing routes between begin and end points of loop project = 16.8 miles

- Connectivity Score = (16.8 – 10.2) / 10.2 x 100 = **64.7 points**

Note*: These routes may or may not match the parallel routes identified from the Needs (Congestion and Safety) criteria*. Where they do not match it is because the Congestion and Safety data needs are only available on the Statewide Tier and in this factor, the routes may include Regional and Sub-Regional tier routes.

Scoring System for Loop Projects

Each project will be ranked using a benefit-cost type methodology, called the Priority Ratio (the higher the priority ratio, the higher the rank). The Priority Ratio will consist of the numerator being the sum of the weighted points from each "needs" and "benefits" criteria. The denominator of the Priority Ratio will be the remaining total cost to complete the loop project using loop funds. In order to have a reasonable number for the priority ratio, the numerator is multiplied by 100 and the denominator is multiplied by 1,000,000 (or the priority ratio is multiplied by 100,000,000)

The remaining total cost includes right-of-way, utilities, and construction costs (updated to 2010 dollars by NCDOT), but not operational or maintenance costs (since loop funds are not used for those purposes). Cost information for toll projects is provided by the North Carolina Turnpike Authority. It is important to note that the total cost of each loop project may be reduced by the amount of non-loop funds the Department believes is committed to the loop project. Non-loop funding includes toll revenues and state and/or federal funds such as National Highway System (NHS) or Surface Transportation Program (STP) funds subject to the equity formula. Please note that G.S. 136-66 and 143B states that funding providing by local governments cannot cause any disadvantage to any other project in the Transportation Improvement Program, and therefore cannot be included as non-loop funding in this prioritization process.

Example is shown below:

Criteria	Weight	Points	Weighted Points
Needs			
Safety	5%	56	2.80
Congestion	10%	84.5	8.45
Benefits			
Travel Time Savings (Individual Project)	10%	50	5.00
Travel Time Savings (All Loop Projects w/in Area)	15%	65	9.75
Economic Development	15%	60	9.00
Forecasted 2035 Total Volume	10%	75	7.50
Freight Mobility (Forecasted 2035 Truck Volume)	10%	25	2.50
Multimodal Options	5%	0	0.00
Protected Corridor/Partial Right-of-Way	10%	75	7.50
Connectivity	10%	64.7	6.47
Total	**100%**		**58.97**

Remaining Construction Cost	$125,000,000
Remaining Right-of-Way Cost	$25,000,000
Remaining Utilities Cost	$5,000,000
Total Remaining Cost	$155,000,000
Non-Loop Funding	$45,000,000
Total Remaining Loop Funding Needed	**$110,000,000**

Priority Ratio	**53.61**

If any urban area desires to revisit the amount of non-loop funds committed to any project, please contact the Department. The Chief Operating Officer or the Secretary will then be advised and a decision made whether to deduct the non-loop funds from the total remaining costs of the loop project.

Other Considerations:

It is important to remember the remaining TIP Loop projects are already in various stages of planning or project development. Once the rankings are determined, there will still need to be a check on the status of each loop project to help determine the most cost-effective method of scheduling these remaining loop projects. Factors that must be considered include:

- Building usable segments;
- Avoiding lapse of planning documents and permits & consider status of project in the Merger process;
- Consideration of homeland security and national defense;
- Constructing the project in the timeframe to meet an air quality conformity determination and if so, what year it must be completed;
- Paying for cash flow projects started in prior years;
- Applying funds to areas based on capacity of industry (including construction costs, inflation, volumes of work);
- Local land use plan compatibility.

None of these factors are given any points in the scoring but will be considered by the Secretary in determining whether any project advances to construction. Also, it is recognized that the TIP loop projects are further broken down into segments for purposes of construction lettings. If a TIP project is selected for funding, the Department will work with the urban area to determine which segment would be the most cost-effective segment to construct first.